

OBJECTIVE The aim of this literature review is to study the role of microglia in aging, neuroinflammation, and some animal neurodegenerative diseases, comparing Prions and Cognitive dysfunction syndrome (CDS) with Alzheimer's disease (AD) and Canine degenerative myelopathy (CDM) with Amyotrophic lateral sclerosis (ALS).

MICROGLIA

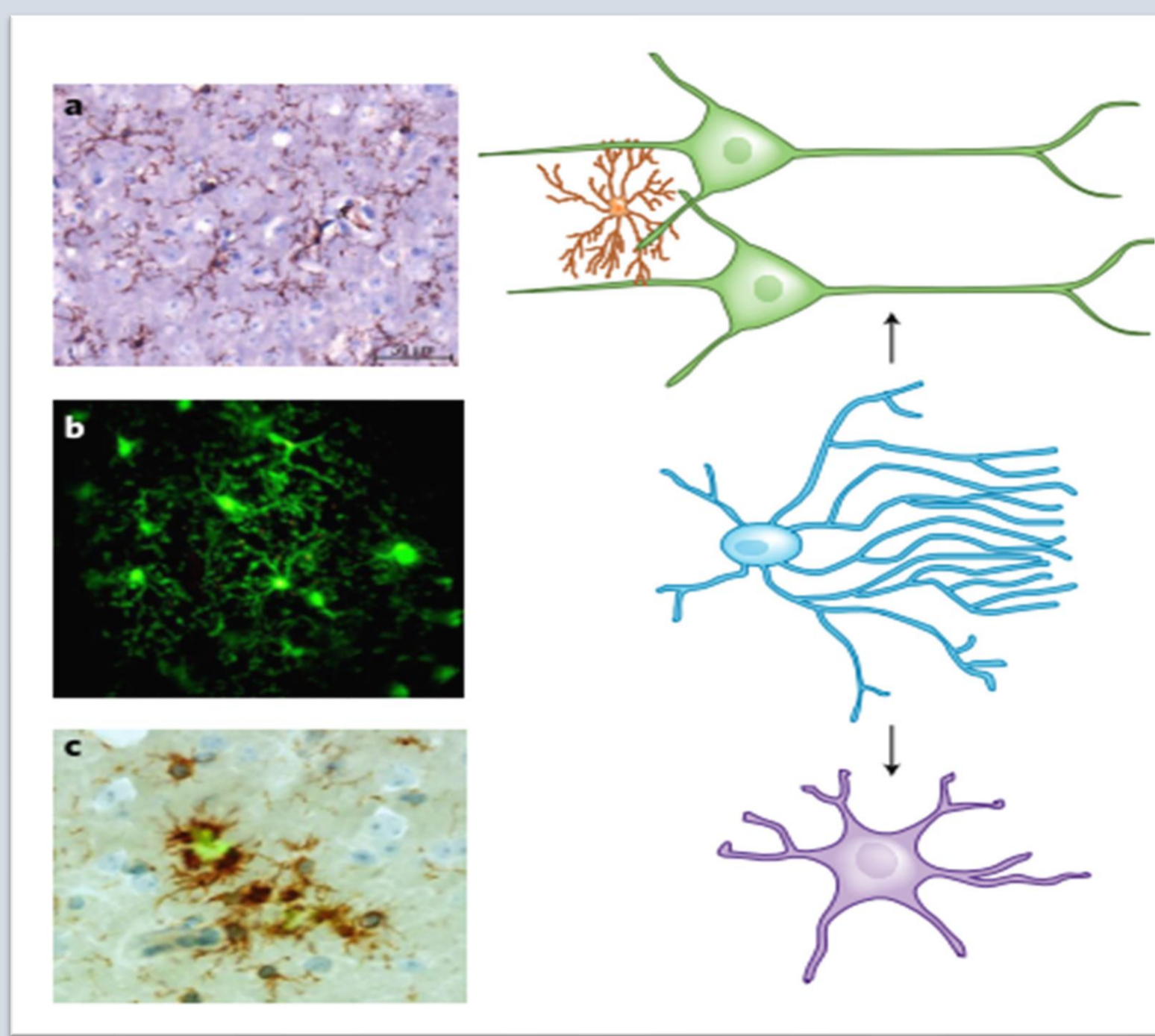


Figure 1. The three states of microglia. a: Physiological b: Branched c: Amoeboid. Image from Hickman et al. 2018, modified.

FUNCTIONS

- Phagocytosis
- Onset and inhibition of neuroinflammation
- Help reshape neural circuits and remyelination
- Neurogenesis and neuronal migration
- Neuroprotection and repair damaged tissue

NEUROINFLAMMATION

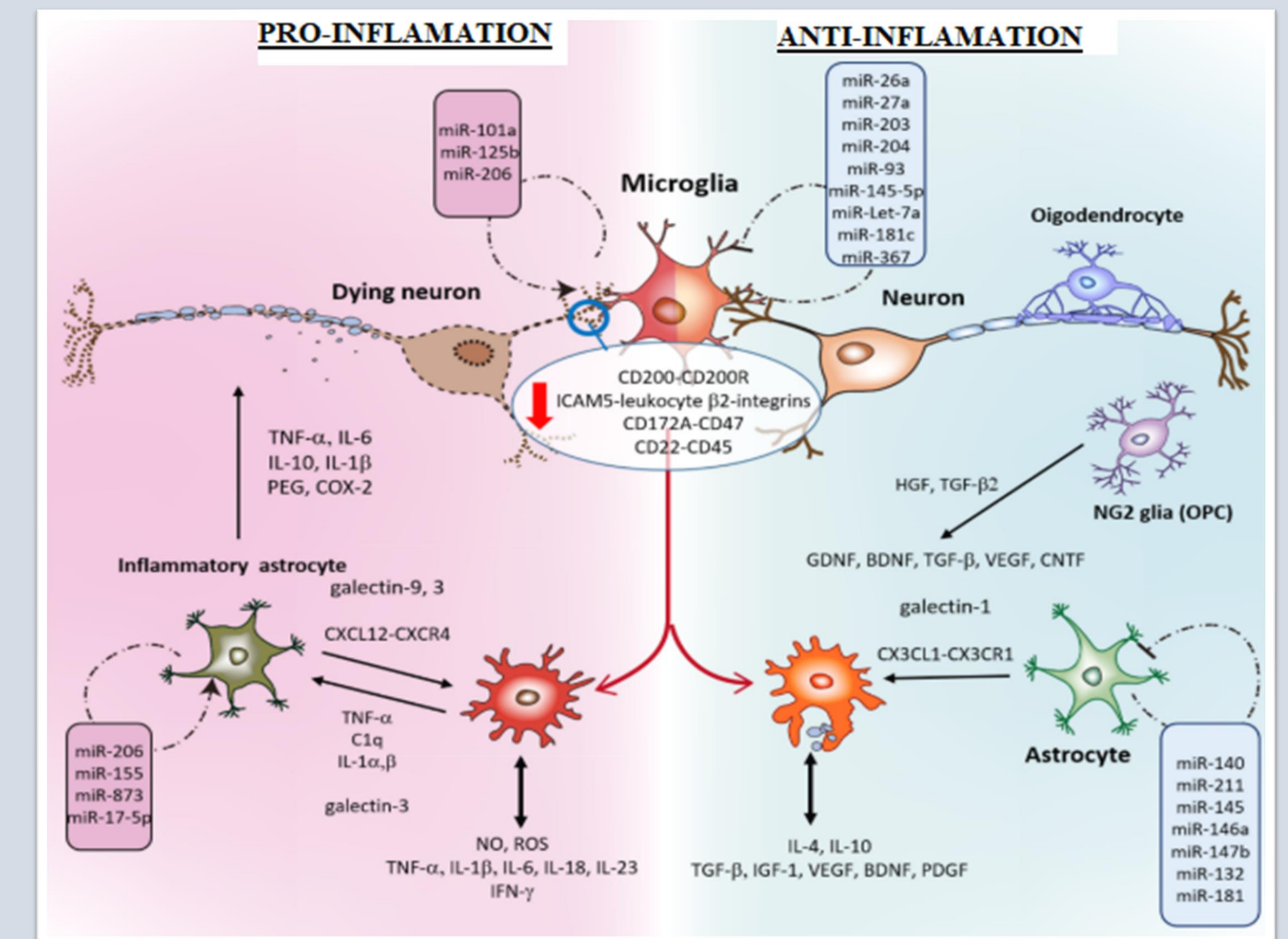
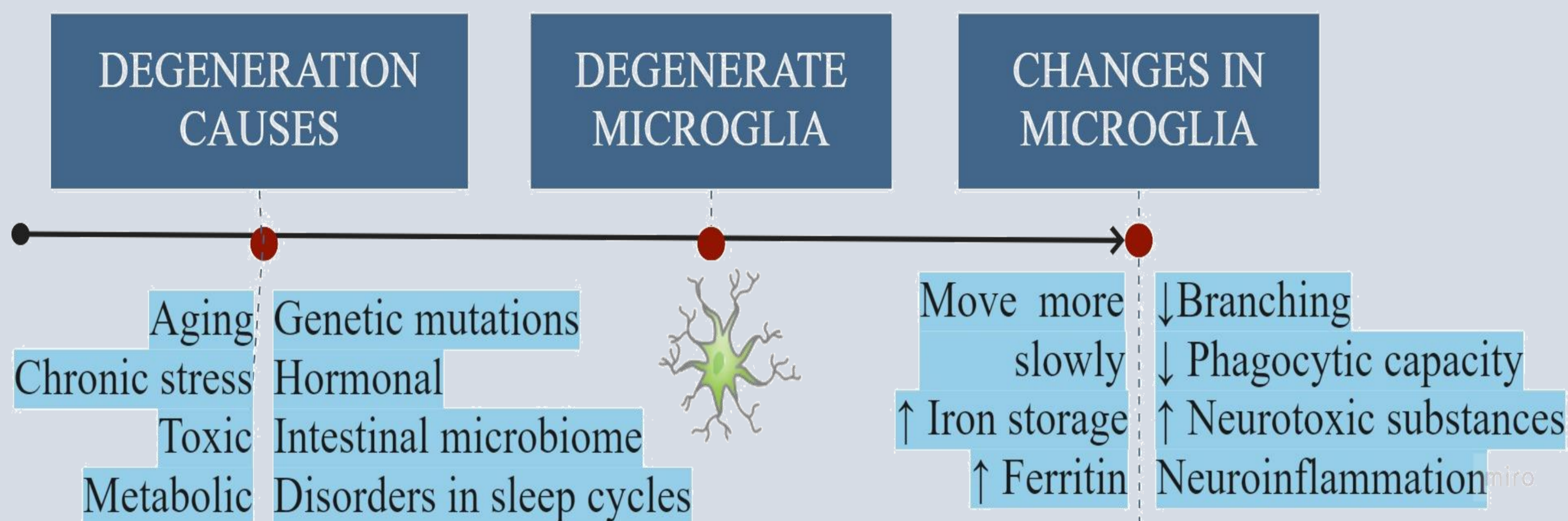


Figure 2. Figure from Yang and Zhou 2019, modified.

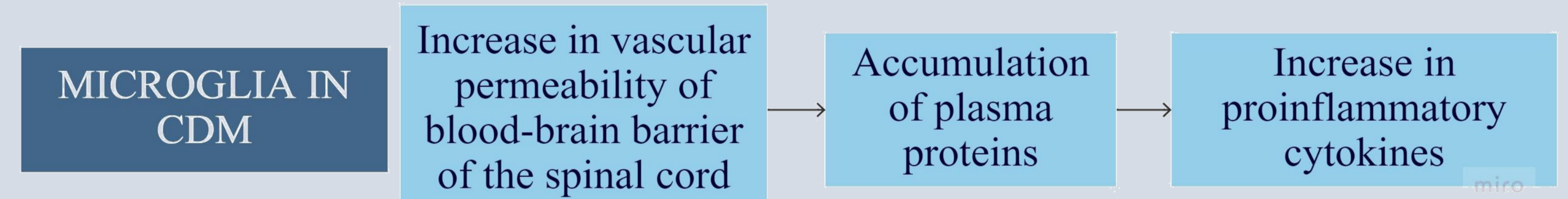
NEURODEGENERATION



CANINE DEGENERATIVE MIELOPATHY

SIMILARITY BETWEEN CDM AND ALS

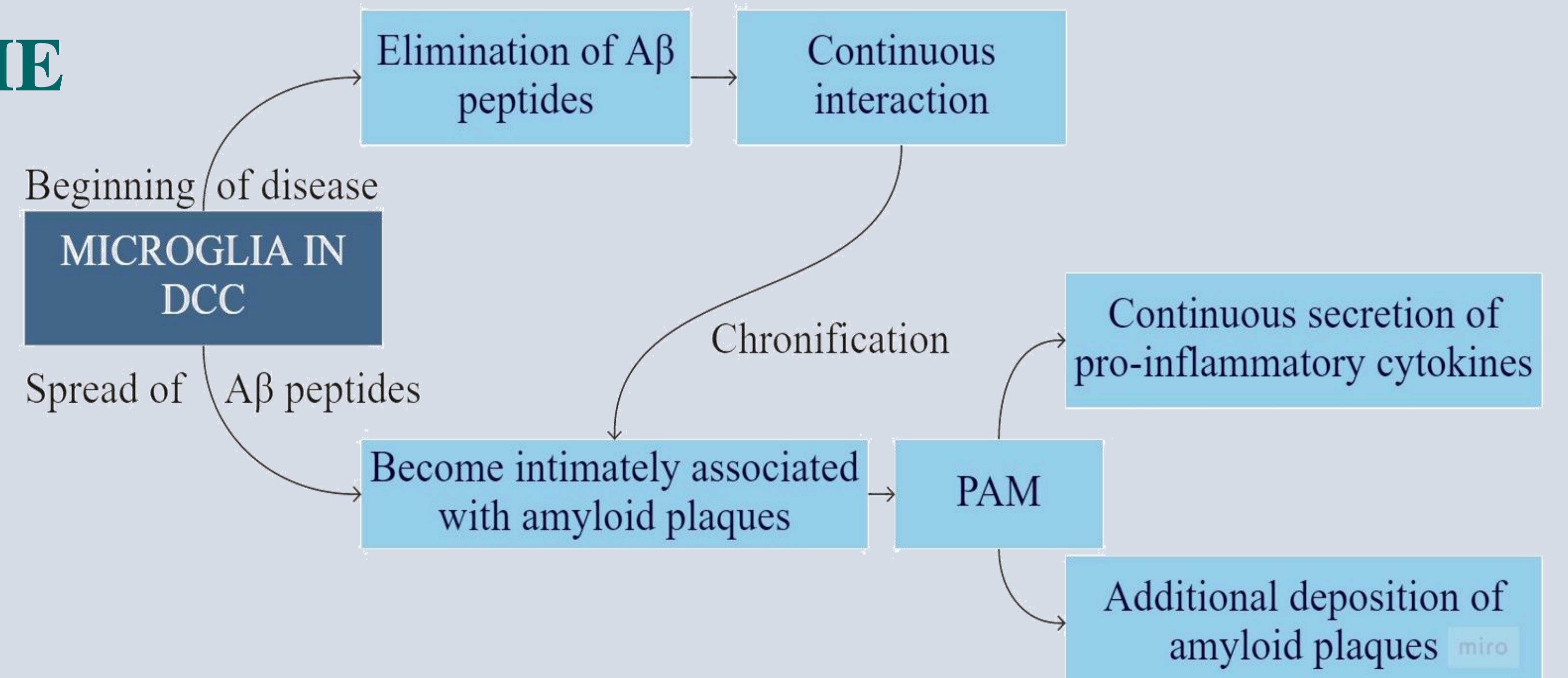
- Mutation in SOD1
- Appearance and progression of the disease
- Increase of microglia and astrocytes



COGNITIVE DYSFUNCTION SYNDROME

SIMILARITY BETWEEN CDS AND AD

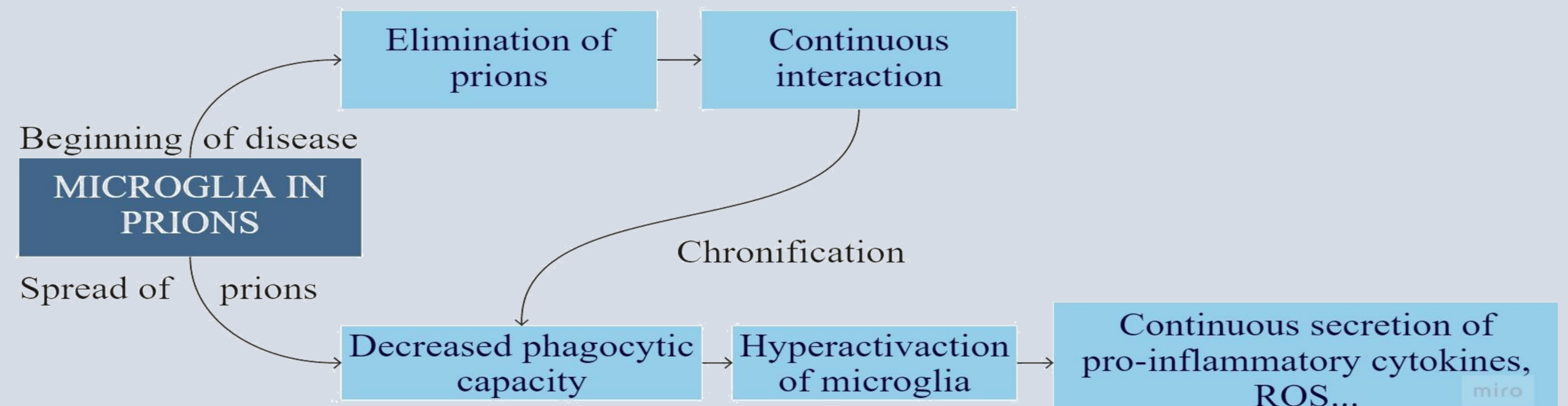
- Aβ plates
- Microglia and astrocytes dysfunction
- Oxidative damage and mitochondrial damage
- Cerebrovascular diseases
- Glutamate-mediated excitotoxic
- Impaired glucose metabolism



PRION DISEASE

SIMILARITY BETWEEN PRIONS AND AD

- Progression of the disease



CONCLUSION The microglia is the protective cell of the CNS. Neuroinflammation is the innate immune response designed to eliminate pathogens, poorly folded proteins, among other things. During the initial phase the microglia presents a defensive Response, Pro-inflammatory state, while at the progression stage, it changes to a non-inflammatory state. An excessively activated microglia is a risk factor for neurodegenerative diseases as it loses phagocytic capacity and, in addition, will be unable to properly regulate the pro/anti-inflammatory balance and becoming a chronic inflammation.

BIBLIOGRAPHY

- Hickman S, Izzy S, Sen P, Morsett L, El Khoury J. 2018. Microglia in neurodegeneration. *Nat Neurosci.* 21(10):1359-1369. doi:10.1038/s41593-018-0242-x.
- Yang Q qiao, Zhou J wei. 2019. Neuroinflammation in the central nervous system: Symphony of glial cells. *Glia.* 67(6):1017-1035. doi:10.1002/glia.23571.